refused to make changes, citing insufficient evidence about the various pole sizes in a particular density zone.[39] The FCC decision is perplexing. The RUS data clearly indicated that the RUS companies used various pole sizes. Common sense proves that not all poles are shared. The FCC cited no evidence to contradict these facts, but adhered to its flawed approach, unsupported by any evidence in the record, that allows the use of only one pole size and assumes that all poles are shared. The FCC should increase the share of the aerial structure costs borne by the ILECs to account for the undisputed fact that not all poles are the same size and not all are shared.

THE TFI STUDY SUPPORTS
THE USE OF AT LEAST
$45 PER LINE FOR MDF AND POWER

30. I requested that Technology Futures, Inc. ("TFI") review the FCC's use of the TFI Study that was cited in the Order.[40] TFI has concluded, as have I, that the FCC misused the TFI Study in many significant ways.[41] As a result, its estimate for MDF and power investment is implausibly low. The FCC should correct its errors and adopt a conservative estimate of at least $45 per line to account for MDF and power investment for the RUS data.

31. The FCC mistakenly assumes that the "shell" percentage in the TFI study includes all MDF and power investment. According to TFI, the "shell" in

[39] Order at ¶ 222, fn 465.

[40] Order at ¶ 305, fn 638.

[41] Letter from Roy L. Hodges, Technology Futures, Inc., to Dr. Jason Zhang, GTE (dated December 22, 1999), attached as Attachment B to GTE's Petition for Reconsideration of the 10th Report and Order.

the TFI Study contained only part of MDF and power investments. It does not include "the protectors and the outside plant (OSP) cable terminated on the MDF," nor does it include "significant investments in power cables, fuse panels, filters, and low voltage electronic power equipment" that "was assigned directly to modules other than the shell."[42]

32. Second, the FCC misapplied the "shell" percentage that was derived from 1996 data to 1999 partial switching investment to estimate the amount of the MDF and power investment. In addition to its erroneous assumption that the "shell" included all MDF and power investment, the FCC's application of the ratio to 1999 partial switching investment suffered two more errors. The first is that the "shell" ratio in 1999 is expected to be substantially higher than the 8% for 1996. This is due to fact that while the total switching investment per line declined between 1996 and 1999, the costs of the "shell" components likely increased in the same period. As a result, the 1999 "shell" percentage would be substantially higher than 8%. The use of the 1996 "shell" percentage to 1999 switching investment will lead to substantially underestimated "shell" investment. The second error is that the FCC applied the "shell" percentage only to partial switching investments, rather than total switching investments.[43] This error compounded the extent of the underestimation for MDF and power investment. Based on 1996 FCC data, the TFI estimated "shell"

[42] *Id.* at p. 2.

[43] *Id.* at p. 1.

investment alone was about $33 per line in 1996, and is expected to be even higher for 1999.[44]

33. Third, the FCC's errors have led to ridiculously low estimates for the investments in MDF and power. To see how implausible the estimates are, one only needs to compare them to the estimates based on the HAI Model default values, estimates that have been shown by many to be unreasonably low.[45] Based on a FCC Model default run for GTE-Oregon, the FCC's proposed methodology would produce only about $10 per line for MDF and power investment.[46] In contrast, even the HAI Model default values would produce about $18 per line.[47] That is, the MDF and power investment estimated by the FCC is about one-half the unrealistically low HAI Model estimate.

34. Fourth, a reasonable estimate for MDF and power investment is much higher than the FCC estimate. According to TFI, the amount of "shell" investment for 1996 was about $33 per line, and is expected to be higher for 1999.[48] TFI's value of $33 per line is a conservative estimate for "shell" for 1999. To arrive at the amount of investment for MDF and power

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[44] *Id.* at pp. 2-3.

[45] For example, SBC indicated the reasonable MDF per line is $30. Universal Service Cost Model Docket, *Comments of SBC Communications Inc.,* (July 23, 1999) at p. 13 ("SBC Comments"). Sprint and GTE also commented that the HAI power investments were unreasonably low. Universal Service Cost Model Docket, *Comments of Sprint Corporation,* (July 23, 1999) at p. 44, Attachment 7 ("Sprint Comments"). *See also* GTE Comments at p. 66.

[46] The FCC Model default runs produces about $129 per line switching investment for GTE-Oregon. Applying 8% to that yields $10.32.

[47] The $18 HAI value includes $12 for MDF and $6 for power.

[48] Attachment B at pp. 2-3.

required in the FCC Model, the parts of MDF and power that are not included in "shell" must be added. These include "the protectors and the outside plant (OSP) cable terminated on the MDF," and "significant investments in power cables, fuse panels, filters, and low voltage electronic power equipment" that "was assigned directly to modules other than the shell."[49] Due to time constraints, I have not been able to estimate precisely the amount of those excluded investments except for the protectors, which is about $12 per line. Ignoring at this time other excluded investments, the "shell" and the protectors investments combined is already $45 per line, obviously, a conservative estimate for 1999. GTE encourages the FCC to adopt this estimate.

THE FCC DID NOT SEEK COMMENT ON CERTAIN INPUT VALUES

The HAI Default Inputs

35. As many parties to this proceeding have concluded, including the FCC, the HAI Model default inputs are mostly based on the unsubstantiated opinions of its developers, and are mostly on the low side.[50] GTE expressed concerns about those inputs, with no response from the FCC.[51] Even worse, the FCC has apparently adopted some of those HAI Model default values without reasonable justification.

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[49] *Id.* at p. 2.

[50] *See* GTE Comments at p. 66; SBC Comment at p. 13; Sprint Comment at p. 44, Attachment 7; Order at ¶ 165.

[51] GTE Comments at Attachment 1.

36. Most of the now adopted HAI Model default inputs are located in the Model's end office and tandem switching, SS7 network and interoffice network components. For example, the HAI Model used two factors to reduce the tandem common equipment investments.[52] First, the calculated common equipment is arbitrarily reduced by 40% to account for the sharing with EO wire center. After the 40% reduction, the investment that is attributable to the excess capacities in tandem office,[53] is further reduced by 50%. There is no evidence that an investment reduction to this extent is possible, and such arbitrary sharing would lead to seriously underestimated costs for tandem investments. The FCC never put those inputs out for comments and, worse, adopted them without reasonable justification.

The PNR Data

37. In response to Bell Atlantic and Sprint's concern that the line counts generated by the National Access Line Model do not match their actual line counts, the FCC indicated in its Order that the Model will true up the line counts to reflect the 1998 ARMIS line counts.[54] However, the FCC did not indicate how the 1995/6 PNR surrogate data would be adjusted to reflect the 1998 location counts to be consistent with the FCC-adopted

[52] *See* RFCC_switching_io_October1999.xls, 'tandem and STP investment'! D12: total common equipment investment. The two reduction factors are inputs!C130 (40%--- tandem/EO wire center common factor) and inputs!C89 (50%---- common equipment intercept factor).

[53] The investment is calculated as the difference between maximum design capacities and the capacities that would be needed for all the switched lines in the entire study area based on study area averages.

[54] Order at ¶ 61.

1998 line count.[55] Since there is a large increase in the line counts between 1996 and 1998, corresponding increases are expected in the number of new residential and business locations. Adjusting line counts to 1998 without a corresponding adjustment to location counts will lead to substantially underestimated costs, and a substantially smaller universal service fund, because it will lead to economies of scale that do not exist. For example, switched lines increased about 10% between 1996 and 1998 in GTE South-Kentucky. Without making the location counts consistent with the 1998 line count, the FCC Model would underestimate the universal service costs by more than $2 per line.[56] Updating the line counts from 1996 to 1998 without also updating the location counts is like using a network built based on 1996 demand to serve 1998 demand. To arrive at correct cost estimates, the location counts must be updated to be consistent with the line counts, as AT&T and MCI noted, "the key issue is the consistency of the numerator and denominator."[57]

38. There are a number of ways to make the location counts consistent with line counts. As shown here, the most straightforward way is to use the ratios of 1998 switched lines to 1996 switched lines for each wire center to determine the number of residential and business locations for 1998. For

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[55] According to the FCC and HAI documentation, the PNR road surrogate data reflect the numbers of lines and locations for 1995/6. Order at p. 41; HAI Model Release 5.1 Model Description at pp. 24-26.

[56] The example is based on the default runs using the most recent FCC Model and PNR data that are available to GTE. The FCC default run produces $31.86 using 1998 line counts. The use of 1996 line counts produces $33.94 per line.

[57] Order at ¶ 56.

each wire center: (1) Calculate the ratio of switched lines between 1998 and 1996 for residential and business lines respectively; (2) Use the 1996 PNR location data to find out (a) the total number of residential and business locations, and (b) the average lines per location for residential and business, respectively; (3) Multiply the ratios arrived at in (1) to the total location counts in (2) for residential and business respectively to arrive at the total number of residential and business locations for 1998; (4) For the locations that are contained in 1996 PNR location data, their location line counts would remain the same as in 1996 PNR location data. For the locations that are new in 1998, their location would be calculated by dividing the total number of 1998 new lines by the total number of 1998 new locations, for residential and business respectively. The number of 1998 new lines and 1998 new locations are derived by subtracting the 1996 lines and locations from 1998 lines and locations. And finally, (5) the locations and line counts arrived at in (4) are geocoded using the FCC adopted road surrogate method to create the PNR location data for 1998.

39. GTE is not able to ascertain if the final PNR data selected by the FCC contains consistent line and location counts. The FCC should make available the new PNR data to allow interested parties to analyze and comment on them, before they are adopted.

Final Model and Inputs

40. As of today, GTE still has not received the final FCC Model and inputs, as adopted in the FCC Order, and cannot duplicate the FCC's published

results. For example, GTE is still unable to duplicate either the published FCC results as contained in its Order or available via USTA for GTE South-Kentucky. The FCC results contained in the Order[58] indicate a switched line weighted cost of $34.24 per line, while the FCC results via USTA[59] indicate a different line weighted cost per line of $33.88. But, the use of the most recent available FCC Model and inputs on the FCC website (dated November 5, 1999) and the most recent PNR surrogate data available to GTE (dated July 17, 1999) produced only $31.86 per line, which is substantially different from either of the FCC's results.

41. Without the final Model platform and inputs, the FCC Model cannot be meaningfully evaluated. The FCC should make its proposed inputs and a finalized Model platform available to interested parties so that they may comment on them before they are adopted.

THE FCC SHOULD APPLY ITS CRITERIA CONSISTENTLY IN INPUT SELECTIONS

42. The FCC used inconsistent criteria and reasoning to select input values.

Inconsistent Use Of Company-Specific Inputs

43. The FCC rejected the use of company-specific inputs, but then used company-specific data from Bell Atlantic Maine to set purchasing power adjustments to reduce the cable costs from the NRRI Study.

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[58] From the FCC results contained in support_october_1999.xls.

[59] USTA CD labeled "HCPM/HAI Synthesis Cost Proxy Model, Model Results Wire center Basis, November 2, 1999", KY_GTE South Inc - Kent_Default Scenario_WC.xls.

Inconsistent Data Adjustments

44. The FCC adjusted switching costs to 1999 to take full advantage of declining switch costs, but failed to adjust many other inputs, such as copper cable and labor intensive structure costs, some of which are based on 1992 data,[60] for which costs have been increasing over time. It appears that these adjustments were not made because they would produce higher costs.

Inconsistent Selection Criteria and Reasoning

45. The FCC rejected the use of its own requested industry data on cables and structures, claiming that (1) the data were "not verifiable" because most respondents did not trace the costs by "providing copies of these contracts and all of the interim calculations for a single project or a randomly selected central office,"[61] (2) in certain cable installation cost calculation, "loading factors appear to be overstated,"[62] and (3) certain data provided by the respondents did not confirm to FCC requests.[63] On the other hand, despite containing similar or even worse infirmities, the FCC found the NRRI Study data and even the PNR's National Access Line Model acceptable. The NRRI data did not have contracts attached to

[60] For example, the FCC uses 1992 Massachusetts advertising expense in its marketing expense calculation.

[61] Order at ¶ 107.

[62] Order at ¶ 108.

[63] Order at ¶¶ 109-110.

enable third parties to duplicate the contract prices used by the NRRI Study. As documented extensively by GTE and others, the costs as constructed by the NRRI Study's authors, using many unjustified assumptions and allocations, do not even correspond to the geological data that they use to explain the variations in the contract costs. Some of the geological variables are based on the data fabricated by developers of the HAI Model. The NRRI data also contain many observations with zero values for material or labor costs.[64] Even worse, the NRRI Study's authors arbitrarily eliminated loading costs, some as high as 10.44% of the contract amount, from some contracts due to uncertainty on how to assign them.[65] The only reason that the FCC continues to rely on the NRRI data seems to be that the FCC's flawed analysis based on the data yields low costs and a small universal service fund. The PNR's National Access Line Model (NALM) is even more problematic in that it is a commercial proprietary product that seems to produce incorrect line distributions. While the FCC acknowledged that the NALM contained proprietary information and a very complicated process consisting of several steps, it believed interested parties have been given the opportunity to review and understand it because the HAI Model sponsors have some explanatory documents and PNR has made itself available for inquires.[66] Previously, however, when numerous ILECs responded to a FCC data request on

[64] *See Sprint Ex Parte* (dated January 29, 1999) at Attachment 5.

[65] GTE Comments at p. 18.

cable and structure costs, provided ample related documentation, and (I believe) made themselves available for inquiries, the FCC did not think that was good enough. As pointed out by Bell Atlantic and Sprint and acknowledged by the FCC, the NALM has produced significantly different line counts in their study areas. The incorrect results should have added to the importance of verifying NALM. Instead, the FCC simply proposed to true up the line counts to the ARMIS data without looking into whether NALM produced correct line distribution across and within wire centers.

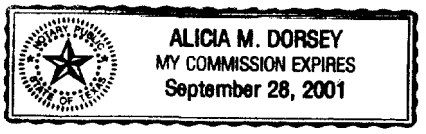
[66] Order at ¶ 55.

I hereby swear, under penalty of perjury, that the foregoing is true and correct.

Jason Zhang

Jason Zhang

Subscribed and sworn to before me this 29 day of December 1999.



Alicia M Dorsey

Notary Public

My Commission Expires: September 28, 2001

B

TECHNOLOGY FUTURES INC.
13740 Research Boulevard., Suite C-1, Austin, Texas 78750-1859 • (800) TEK-FUTR • (512) 258-8898
Fax: (512) 258-0087 • Internet: http://www.tfi.com • e-mail: info@tfi.com

December 22, 1999

Dr. Jason Zhang
GTE Corporation
600 Hidden Ridge, HQE02D33
Irving, TX 75038

Dear Dr. Zhang,

Technology Futures, Inc. (TFI) offers the following comments concerning the use of one of its reports in the FCC's 10th Report and Order on Universal Service, paragraph 305 and associated footnote 638:

- The FCC incorrectly concluded that the 8% "shell" investments in the TFI Study included all Main Distributing Frame (MDF) and power investments.
- The FCC's proposed adjustment also incorrectly applied the 8% factor to the RUS data which included only investments without MDF and power. The correct factor for the proposed adjustment for the 8% is 8.7%.
- Based on the TFI Study and the FCC's 1996 data, a conservative estimate of the "shell" investment which does not include all MDF and power investment is at least $33 per line for 1999.

Paragraph 305 states:

> *We find that we should adjust the RUS data for MDF and power equipment costs in a way that is more consistent with the way in which these costs are estimated in the depreciation data set. In depreciation data, MDF and power equipment costs are estimated as a percentage of the total cost of the switch, as are all other components of the switch. Based on the estimates of Technology Futures, Inc., we find these costs were eight percent of total cost.[638] Because we are adjusting the RUS data so that they are comparable with the depreciation data, we find it is appropriate to use a comparable method to estimate the portion of total costs attributable to MDF and power equipment. Accordingly, in order to account for the cost of MDF and power equipment omitted from the RUS information, we conclude that the*

> *cost of switches reported in the RUS data should be increased by eight percent.*

Footnote 638 states:

> *Lawrence K. Vanston, Ray L. Hodges, Adrian J. Poitras, Technology Futures, Inc.*, Transforming the Local Exchange Network: Analyses and Forecast of Technology Change *149 (2d ed. 1997) (TFI Study). The terminology used in the TFI study differs somewhat. What TFI calls "shell" is "the common equipment, such as cabling and power equipment, that is not modular and lasts the life of the switch entity." TFI Study at 136. This includes MDF and power investment.*

The footnote acknowledges a difference in terminology between TFI's definition of the "shell" and MDF and power equipment as omitted from the RUS data. There are, in fact, significant differences. It must be understood that the TFI study is a life analysis and was not intended to identify the total cost of power and MDF. The study instead attempts to group the various components of the digital switch into modules with similar life characteristics. These modules are: processor/memory, switching fabric, trunk interface, digital loop carrier interface, baseband (analog) line interface, and shell.

The "shell" is defined on page 136 (TFI Report) as "the common equipment, such as cabling and power equipment, that is not modular and lasts the life of the switch entity." The FCC footnote 638 correctly contains this definition but inappropriately states, "This includes MDF and power investment." The last quote is incorrect when used to infer that it includes the *total* costs attributable to MDF and power. First, a significant portion of MDF costs are the protectors and the outside plant (OSP) cable terminated on the MDF. These costs are not part of the switching account in depreciation studies. The cabling from the line equipment to the MDF is all that is included. Therefore, some, but not all, of the MDF costs are included as "shell" in the TFI study. Second, all of the power equipment is not included in the "shell." There are significant investments in power cables, fuse panels, filters, and low voltage electronic power equipment which is associated with specific modules of the life study. This portion of the power investment was assigned directly to modules other than the "shell" since it would retire along with the equipment it supports.

Even without the additional MDF and power investments identified above, the TFI Study found that the "shell" investment per line based on 1996 FCC data was about $33 per line.[1] The "shell" investment per line for 1999 is expected to be even higher. The MDF is primarily metal works and cables while the power equipment is primarily batteries, copper busses and cables, and chargers. These material intense components do not benefit from technology advances and associated price declines as with other components of the digital switch. In fact, they are most likely to increase over time.

In summary, the TFI report category "shell" includes some, but not all, of the MDF and power costs. Based on the TFI report using the FCC's 1996 data, even without including all the MDF and power investments, the "shell" investment per line in 1996 was $33 per line. The "shell" investment per line for 1999 is expected to be even higher.

Sincerely,

Ray L. Hodges
Senior Consultant

[1] Based on an investment of $48,998,744,000 from the 1996 Statistics of Common Carriers Report, Table 2.7 by the FCC. The investment was divided by the number of access lines served by digital switches in 1996 (18,149,000) from Table 10.1 in the June 1999 FCC Monitoring Report. Eight percent of this cost per line equates to $33 per line.

C

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
	)	
Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	)	CC Docket No. 97-160
	)	
	)	

AFFIDAVIT OF FRANCIS J. MURPHY
IN SUPPORT OF
GTE'S PETITION FOR RECONSIDERATION
OF THE TENTH REPORT AND ORDER

Francis J. Murphy, being duly sworn, deposes and says as follows:

Introduction And Summary

1. I am the founder and president of Network Engineering Consultants, Inc. ("NECI"). NECI is a consulting group that specializes in financial analysis, service cost analysis, and engineering cost analysis of the telecommunications industry. We also provide telecommunications engineering services, expert testimony, and witness support for clients in both federal and state proceedings.

2. I have worked in the telecommunications industry for more than 28 years. In my present position, I have analyzed and evaluated telecommunications costing methodologies and models in support of universal service funding and the pricing of unbundled network elements. I have authored reports and provided expert testimony and witness support regarding recurring cost studies, non-recurring

cost studies, collocation cost studies, and avoided cost studies on behalf of my clients in approximately one dozen jurisdictions. My firm has provided expert testimony and witness support for the same models and studies in approximately 20 jurisdictions.

3. Prior to founding NECI, I was employed by NYNEX Corporation (now Bell Atlantic). During my tenure at NYNEX, I held a variety of positions. In my last NYNEX position, I was a staff director responsible for the costing of interstate services, including both recurring and non-recurring studies for existing and new services. I also had responsibility for calculating the exogenous costs associated with various Price Cap filings. Prior to that, I was responsible for calculating and reporting interstate rate of return results. Earlier in my career, I was a network operations manager. My responsibilities in that position included network operations and budget responsibilities that involved central office operations, interoffice facility operations, customer premise installations and maintenance operations, test center operations, and project management.

4. During the past three years, I have analyzed various versions of the HAI Model (previously the Hatfield Model), the AT&T Collocation Model, the Benchmark Cost Proxy Model ("BCPM"), the Hybrid Cost Proxy Model ("HCPM"), and the AT&T Non-recurring Cost Model. More recently, I have analyzed the so called "synthesis" model ("FCC Model " or "Model") adopted by the Federal Communications Commission ("FCC" or "Commission") in its Fifth Report and Order[1].

[1] In the Matter of Federal State Joint Board On Universal Service, In the Matter of Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, CC Docket Nos. 96-45, 97-160, *Fifth Report &*

5. On November 2, 1999, the Commission released its Tenth Report and Order ("Order").[2] Thereafter, NECI attempted to evaluate the inputs adopted by the Commission and the most recent release of the Model platform. A major focus of the evaluation was to determine: 1) if the Model's input assumptions and values, as promulgated in the Order, adhere to current non-rural telecommunications engineering standards and practices, 2) if the input values used by the Model are representative of GTE's network, and 3) if the inputs, in conjunction with the Model platform, develop "reasonably accurate estimates of forward-looking costs."[3]

6. Our evaluation of the Order has identified numerous methodological and theoretical inconsistencies, including the Commission's reliance upon unsupported data, the partial correction of problems, the adoption of Model parameters that are clearly unrepresentative of actual industry experience, and the disregard of commonly accepted planning and engineering practices employed by non-rural local exchange carriers ("LECs"). In the following sections of this affidavit, I report in more detail on each of these problems and why it is my opinion that some of the decisions reached by the Commission raise serious concerns about the reasonableness and accuracy of the costs developed from the Model's underlying assumptions and input values.

Order, FCC 98-279 (rel. Oct.28, 1998). This docket -- 96-45 and 97-160 -- is hereafter referred to and cited as the "Universal Service Cost Model Docket."

[2] Universal Service Cost Model Docket, FCC 99-304, *Tenth Report and Order* (rel. Nov. 2, 1999) ("Order").

[3] Order at ¶ 23.

The Commission's Use of RUS Data Is Inappropriate Because It Is Based On Data From Companies That Are Unlike The Companies For Which The FCC Model Develops Costs

7. The Commission has inappropriately concluded that the use of Rural Utilities Service ("RUS") data to develop the structure and cable cost inputs in the National Regulatory Research Institute ("NRRI") Study[4] "[i]s consistent with the objective of the model to identify the cost today of building an entire network using current technology."[5] The Commission supports this finding through flawed logic that vendor contracts based on consistent RUS engineering requirements outweigh the inefficiencies and inferior technologies that are reflected in the constructed facilities.[6]

8. The record in this proceeding has shown that the RUS engineering standards underlying the RUS contract data are for rural RUS borrowers, and are not the same engineering design standards employed by non-rural LECs.[7] In the affidavit that I filed on December 17, 1998, in support of GTE's Petition for Reconsideration of the FCC's Fifth Report and Order,[8] I commented on the inferior and non-forward looking technology present in the RUS data.

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[4] David Gabel, Scott Kennedy, *"Estimating the Cost of Switching and Cables Based on Publicly Available Data"*, National Regulatory Research Institute, April 1998 ("NRRI Study"). The NRRI Study purports to be based on publicly available data obtained through RUS and the FCC and used to provide cost estimates for placing outside plant facilities and digital switching equipment.

[5] Order at ¶ 118.

[6] Order at ¶ 117.

[7] *See "Bellcore Notes on the Network"*, Issue 3, December 1997, SR 2275, pages 12 – 17 and *"AT&T Outside Plant Engineering Handbook"*, August 1994, Section 13-1.

[8] Universal Cost Model Docket, *"Affidavit of Francis J. Murphy In Support of GTE's Petition For Reconsideration Of The Fifth Report And Order"* (December 17, 1998) at ¶¶ 56 - 58.

9. The Commission has now recognized that certain technologies underlying RUS engineering practices are not forward-looking, and therefore made cost adjustments to the RUS data. But those adjustments do not compensate for the fact that cable and structure costs on which substantial non-rural LEC investment is modeled are derived from data sources that are unlike the very companies for which the costs are being developed. Other serious concerns about the NRRI Study and RUS data are detailed in associated affidavits that support GTE's Petition for Reconsideration.[9] For these reasons, the Commission should reject these data and use in their place data proffered by the incumbent LECs.

The Commission's Adoption of the NRRI Study
Data Reflects Arbitrary and Inconsistent Input Choices

10. The use of the NRRI Study and its underlying RUS data also illustrates several inconsistencies in the Commission's decision making and reasoning. These inconsistencies relate both to the use and the failure to use the Turner Price Index ("TPI") and nationwide values.

11. The outside plant files included as part of the NRRI Study show that the RUS data came from vendor contracts dating back to 1986, and were converted to 1997 price levels using the TPI. Significantly, the documentation indicates that although TPIs are available for different regions of the country, the index for the South Atlantic region was chosen to "simpl[ify] things."[10] The record does not establish why the use of the South Atlantic region TPI is a reasonable proxy for establishing a nationwide estimate. Further, the Commission dismissed use of

[9] *See* Affidavit of Jason Zhang and Affidavit of Subhendu Roy attached to GTE's Petition for Reconsideration of the Tenth Report and Order.

[10] NRRI Study at p. 1 of file named PKTMP000.txt.

the TPI that GTE and Ameritech earlier advocated as a means of converting embedded cost to current data, claiming that the index and data underlying it were not part of the public record.[11]

12. The NRRI Study contains another example of inconsistent reasoning by the Commission. Although the NRRI Study used data obtained from a Bell Atlantic - Maine unbundled network element proceeding to develop a buying power adjustment, the Commission apparently did not consider the full record when deciding to use the NRRI Study results to develop a fiber splicing adjustment. In the Maine proceeding, Bell Atlantic testified that RUS fiber splicing costs were inordinately low. Yet, the NRRI Study's authors virtually ignored this testimony, mentioning it only briefly in a footnote, and instead used the data to develop the fiber splicing adjustment that was ultimately adopted by the Commission in the Order.[12]

The FCC Model Ignores Standard Outside Plant Engineering Practices And Fails to Build A Distribution Network That Serves All Users

13. The "industry practice" of building distribution plant to meet ultimate demand is based on engineering standards that were developed and have been used by the "non-rural" LECs for which the Model attempts to develop costs. However, the Commission concluded in the Order "that the fill factors selected for use in the federal mechanism generally should reflect current demand, and not reflect the industry practice of building distribution plant to meet ultimate demand."[13] The Commission alleged that basing fill factors on ultimate demand could create

[11] Order at ¶ 314.

[12] NRRI Study at fn. 46.

excess capacity that "would increase the model's cost estimates to levels higher than an efficient firm's cost[s]."[14] This statement wrongly implies that commonly accepted outside plant engineering practices cause inefficiencies. That is certainly not the case. Both AT&T's outside plant guidelines[15] and RUS guidelines[16] support the industry practice of building to ultimate demand.

14. AT&T's "Interfaced Cable Guidelines," which are the accepted industry standard for sizing distribution cable, dictate that distribution cables be sized for the "ultimate" pair requirements. The accepted engineering standard for pair allocations is two pairs per living unit for residential areas, and five pairs per business unit for distribution areas serving business customers. This standard ensures that there is sufficient spare capacity to handle growth, as well as administration and maintenance functions. The Commission, however, has adopted fill factors that ignore the existence of currently (or temporarily) unoccupied households. As a result, the distribution network designed by the Model does not produce sufficient capacity for growth, administration, or maintenance functions. Therefore, customers who relied on the network produced by the Model would experience lengthy delays in receiving service due

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[13] Order at ¶ 190.

[14] Order at ¶ 200.

[15] AT&T OSPE Handbook, pp. 3-11.

[16] Christopher McLean, *RUS Ex Parte* (dated August 20, 1999). ("This redesign followed other design assumptions of the HCPM, such as designing only to existing customer locations, rather than following the established (and prudent) RUS practice of designing for future customer locations which might be a short distance down the road so as not to have to place a new CSA to serve that probable subscriber in the future.")

to the need to provision additional service capacity. This is a time consuming and costly process not accounted for in the Model.

15. The Commission has presented no engineering evidence that building to ultimate demand is inappropriate when determining forward-looking costs. Quite to the contrary, the record suggests that the Commission has clearly erred in its application of distribution fill factors to line counts that are based on current demand only.[17] Distribution plant should be sized according to established engineering standards and practices that are used by the companies for which the Model is attempting to develop costs.

16. Despite the absence of evidence that the "industry practice" is inefficient, the Commission chose to forego the inherent efficiencies of having distribution plant available at each living unit in a distribution area. In order to capture these efficiencies and avoid the expense and delays associated with pair-by-pair provisioning of distribution plant, the Commission should design the distribution plant according to AT&T's "Interfaced Cable Guidelines" and avoid use of an artificial distribution fill factor in the Model.

[17] Order at ¶ 199.